



# **Fife's Buzzing pollinator survey report- year 3**

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Gabrielle Flinn



*Saving the small things that run the planet*

## Summary

Fife's Buzzing is a three year project and during this time aimed to create wildflower meadows at 16 parks totalling over 12 hectares across Fife. Sites for meadow creation were selected across the Kingdom of Fife to deliver multiple benefits for both wildlife and people. The creation and enhancement of meadows through this project has involved planting a diverse range of native wildflower and grass species of known origin that will provide vital foraging and nesting habitat for pollinating insects and other wildlife.

Surveys to record invertebrates, focusing on pollinating insects, before and after meadow creation have identified species using the meadows as well as changes within the meadow over the project lifetime.

During pollinator surveys in August 2016, a total of 23 sites, selected for meadow creation, enhancement and management in autumn 2015 and spring 2016, were surveyed for pollinators. Baseline surveys were also undertaken in Haugh Park in Cupar, Bankie Park in Anstruther and at Tayport Common in Tayport.

A total of 122 species of invertebrate were recorded during this survey and this total includes 65 species of pollinating insect. A higher number of species of invertebrate were recorded within areas of wildflower rich-grasslands (122 species) than in areas of amenity grassland (five species).

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## 1. Project introduction

Over 97% (~3,000,000 hectares) of flower-rich grassland have been lost in the UK since the 1940's. This is due to the intensification of agriculture to produce more home-grown food and through the wider development of housing, transport infrastructure and industry. These flower-rich areas are vital habitats for a range of wildlife species, particularly pollinating insects such as bees, butterflies and hoverflies. The loss of wildflower meadows across the UK has resulted in a massive decline in pollinators as well as other invertebrate species. Over 250 species of pollinating insects in the UK are in danger of extinction and are on the UK Biodiversity Action Plan (UKBAP) priority species list.

At least eighty percent of plants need insects for pollination and without these plants we would not have the air we breathe and the food we eat. Pollinators are thought to be responsible for one in every three mouthfuls of the food that we eat and it is estimated that 84% of crops in the European Union (valued at £12.6 billion per annum) rely on insect pollinators. In the UK, pollination of agricultural crops by insects is valued at more than £400 million. National reports in the press stress the importance of honeybees in food production but wild bees and other insects are even more important as they are adapted to pollinate a much wider range of plants. With the recent decline in pollinating insects, there is evidence that insect pollinated plants are also declining and at a faster rate than wind and water pollinated plants.

In Fife, there has been a significant loss of species-rich grassland to urbanisation, industrialisation and agriculture (65% of the land area is cultivated as arable farming and 10% is urban). Acid, neutral and calcareous grassland make up a mere 2.8% of Fife's land area and improved, semi-improved and poor semi-improved grassland that are out with arable farming make up 3.4% of land area. Many of the remaining grassland areas are managed strictly for amenity use and consequently, support very little wildlife and few plant species. As a result of the above loss in habitat, species-rich grassland is a priority habitat within the current edition of the Fife Local Biodiversity Action Plan (LBAP) (Figure 1).



Figure 1. Wildflower species-rich grassland created through this project at Silversands in Aberdour.

Buglife joined forces with Fife Council in 2014 to transform mown grassland within urban and rural parks into colourful and wildlife-rich wildflower meadows across the region. These wildflower meadows are not only providing habitat for invertebrates but are also providing food and nesting sites for a range of other wildlife such as birds, amphibians and small mammals including bats, of which all six species in Fife are a priority in the LBAP.

As well as being important for wildlife, meadows also offer enormous benefits for people. The wildflower meadows have created stunning natural areas that have improved the quality of greenspace for local residents and visitors to enjoy which can have a positive impact on the health and well-being of park users. Long grass and wildflowers also absorb more pollution than cut grass which helps to provide cleaner air. Additionally, these meadows are being used as an educational tool by community groups and schools to help improve local understanding of a native habitat and pollinators such as bees. The Fife's Buzzing project has helped bring communities together through the creation, management and enjoyment of wildflower-rich grasslands.

Fife's Buzzing initially aimed to create 16 meadows (c. 12.6 hectares) across Fife. Sites for meadow creation and enhancement were selected in order to deliver multiple benefits to wildlife and people. Two and half years into the project, meadows have been created at 23 sites across Fife including two that were created in autumn 2016 (these further two areas will be surveyed in spring 2017).

The Fife's Buzzing project started in August 2014 and is funded by the Heritage Lottery Fund and Fife Environment Trust.

## **2. Pollinator survey method**

At all meadow areas created through this project, Buglife have undertaken surveys to record invertebrates, focusing on pollinating insects, before and after meadow creation to highlight the benefits to local wildlife. During surveys the meadows created through this project and neighbouring amenity grassland were surveyed to compare how beneficial each were for pollinator diversity and to local wildlife. This report will focus on the invertebrates recorded during the surveys with particular reference to pollinating insects.

During year three of the project in August 2016, Buglife surveyed all the meadows that had been created since August 2014 and areas which were soon to be created in autumn 2016. A total of 21 meadows were surveyed in August 2016. This includes 16 meadows that had been created in year one and two of the project (Dunnikier Park, Dunnikier Park Golf Course and Ravenscraig Park in Kirkcaldy; Cotlands Park in Kennoway; Poplar Road in Methil; Public Park in Dunfermline; Riverside Park, Formonthills and Bumblebee Wood Park in Glenrothes; Silversands and the Shinty Pitch in Aberdeen; Guardbridge Park in Guardbridge; Leuchatsbeath Community Wood in Cowdenbeath; Woodend Park in Cardenden; and Botanic Gardens in St. Andrews; and Dalbeath Farm in Cowdenbeath) and five meadows that were new to the project as of spring 2016 (Bankie Park in Anstruther; Haugh Park and Cupar Orchard in Cupar; Tayport Common in Tayport; and Commscope in Lochgelly) (Table 1). The new meadows also required baseline surveys. Lochgelly based company Commscope

created a Fife's Buzzing meadow in spring 2016 with advice from Buglife and the owners of Dalbeath Farm near Cowdenbeath agreed to manage a hectare of their land as a wildflower meadow as a contribution to the project. No baseline surveys were carried out at Cupar Orchard, Dalbeath Farm or Commscope as there was no nearby amenity grassland for comparison.

Invertebrates were surveyed during a single visit to each park during dry and warm days in July/August 2016 (Table 1); there were two visits to Dalbeath Farm as an initial survey was carried out in spring and then alongside the summer surveys.

Table 1. Date, grid reference and timing of habitat creation of meadow area surveyed at each of the 21 parks.

Park Name	Town	Grid Reference	Date Surveyed	Habitat Creation
Dunnikier Park	Kirkcaldy	NT280940	17/08/2016	Autumn 2014
Dunnikier Park Golf Course	Kirkcaldy	NT278946 (Meadow), NT279943 (Pond East) and NT277943 (Pond West)	17/08/2016	Autumn 2014 Spring 2015
Ravensraig Park	Kirkcaldy	NT296925	17/08/2016	Autumn 2014
Cotlands Park	Kennoway	NO353027	08/08/2016	Spring 2015
Poplar Road	Methil	NO356004	08/08/2016	Spring 2015
Public Park	Dunfermline	NT099872	08/08/2016	Spring 2015
Riverside Park	Glenrothes	NO262016	19/08/2016	Spring 2015
Silversands	Aberdour	NT197852	17/08/2016	Spring 2015
Shinty Pitch	Aberdour	NT195855	17/08/2016	Spring 2015
Guardbridge Park	Guardbridge	NO449199	24/08/2016	Spring 2015
Formonthills	Glenrothes	NO255036 (North Meadow), NO254035 (South Meadow) and NO260035 (Wetland Meadow)	19/08/2016	Autumn 2015
Bumblebee Wood Park	Glenrothes	NT255999	19/08/2016	Autumn 2015
Leuchatsbeath Community Wood	Cowdenbeath	NT156926	08/08/2016	Autumn 2015
Woodend Park	Cardenden	NT228952	19/08/2016	Autumn 2015
Bankie Park	Anstruther	NO568038	31/08/2016	Spring 2016
Haugh Park	Cupar	NO378146	24/08/2016	Spring 2016
Cupar Orchard	Cupar	NO373140	24/08/2016	Spring 2016
Tayport Common	Tayport	NO467279 (Bus Turning Circle), NO463285 (Pond	24/08/2016	Spring 2016

		Area), NO466281 (Rough Grassland Area), NO464285 (Sea Front Circle)		
Commscope	Lochgelly	NT201935	31/08/16	Spring 2016
Dalbeath Farm	Cowdenbeath	NT149908	17/05/2016 and 05/07/2016	Autumn 2015
Botanic Gardens	St. Andrews	NO500161	31/08/2016	Autumn 2015

During a survey, the surveyor walked a transect across the wildflower meadow or area of amenity grassland being surveyed using direct observations and a sweep net to survey for invertebrates concentrating on pollinating insects such as bees and wasps (Order Hymenoptera), hoverflies (Family Syrphidae, Order Diptera) and butterflies and moths (Order Lepidoptera). Other invertebrate species found during the survey were also recorded. A complete list of invertebrate species recorded during this survey can be found in Appendix 1.



Figure 2. Pollinator surveys at Dalbeath Farm.

## 2.1 Sweeping vegetation

Sweep nets were used to collect invertebrates from vegetation, particularly from flower heads (Figure 2). A canvas net was swept over vegetation in a figure of eight for one minute in a transect across a site and specimens were then collected from the net. Specimens collected in this way were either put into a pot with 70% ethanol to be identified later or if they could be identified by the surveyor at the park the specimen was released.

## 2.2 Direct observations

Identification of several species of bees, wasps, butterflies, moths and hoverflies were made through direct observation of specimens visiting flowers or in flight during a site survey. Sweep nets were sometimes used to aid in identification of a species which could then be

released. Other species identified through direct observations included true bugs (Order Hemiptera), and some beetles (Order Coleoptera).

### 3. Results

A total of 122 species of invertebrate were recorded in surveys across the 21 parks in Fife in August 2016; some individuals of parasitoid wasps (Hymenoptera), sawfly (Hymenoptera), crane fly (Diptera), spider (Aranea), weevil (Coleoptera), rove beetle (Coleoptera), lacewing (Neuroptera) that were collected or observed could not be identified down to species. Of the total number of invertebrates recorded in this survey, at least 65 were pollinating insects. Hoverflies and other pollinating flies made up the greatest number of pollinator species recorded with a total of 27 across all parks (Figure 3). Fifteen species of butterflies and moths and sixteen species of pollinating bees, wasps and ants were recorded across all the parks (Figure 3). Pollinating beetles were considered as flower-visiting ladybirds, soldier beetles, rove beetles, click beetles and weevils as defined in Pollination and Floral Ecology (Willmer, 2011). A total of 57 other species of invertebrate were recorded and this included true bugs (Hemiptera), spiders (Aranea) and slugs (Gastropoda).

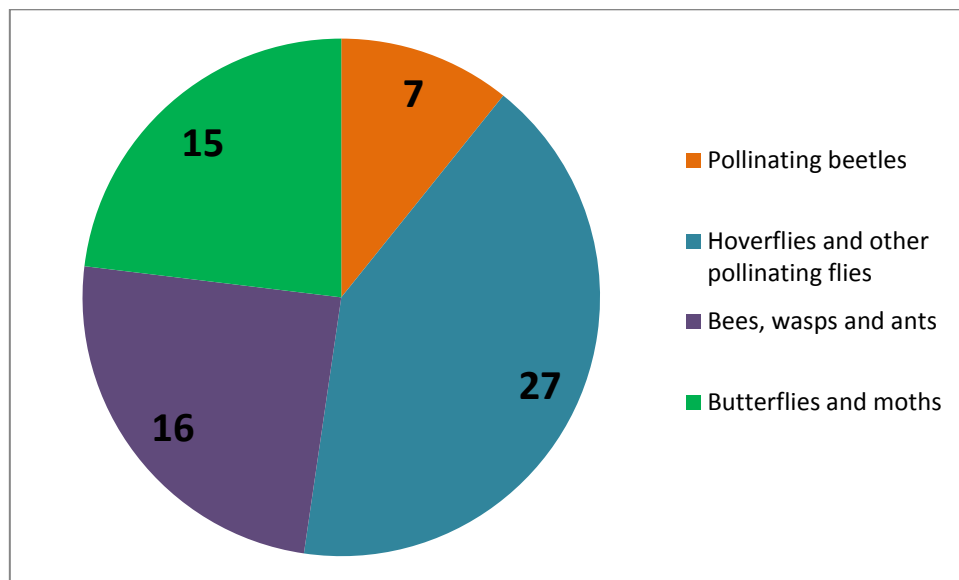


Figure 3. Total number of pollinator species recorded across all 23 sites surveyed in Fife

The average number of pollinator species found at wildflower-rich grasslands was 22.62 species whilst the average number of pollinator species found at amenity grasslands was 1.67 species. Tayport Common had the greatest diversity of invertebrates recorded with a total of 40 species (Figure 4). At amenity grassland areas within Tayport Common and Haugh Park a total of five invertebrate species were found (Figure 5). No invertebrates were recorded at Bankie Park in Anstruther (Figure 4).

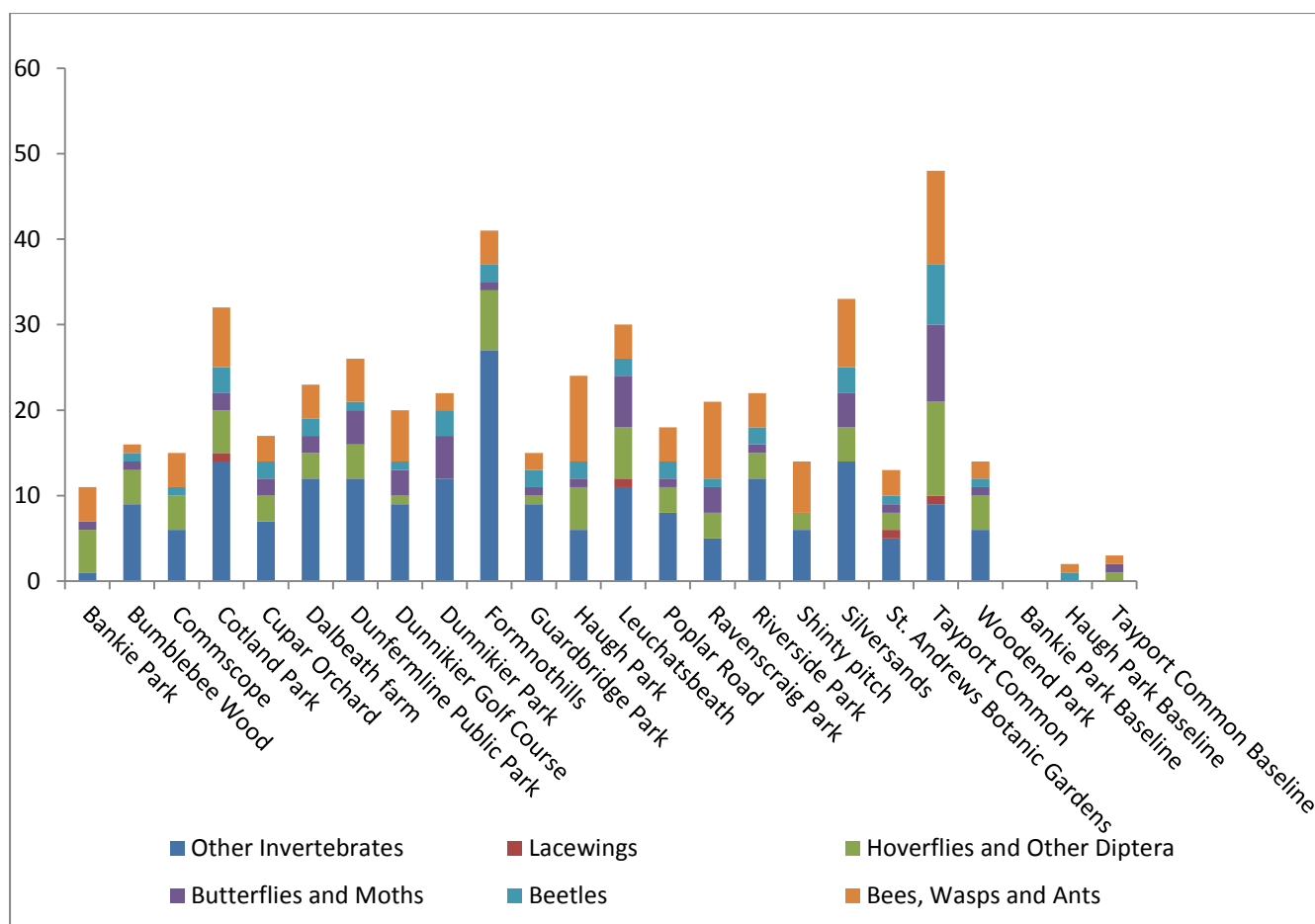


Figure 4. Total number of species recorded from 21 meadow sites and from three amenity grassland baseline surveys.

Site	2014 Amenity Grassland Species Count	2015 Wildflower-Rich Grassland Species Count	2016 Wildflower-Rich Grassland Species Count
Cotlands Park	1	20	18
Dunnikier Park	3	14	10
Dunnikier Golf Course	0	6	11
Dunfermline Public Park	2	5	14
Poplar Road	0	20	10
Ravenscraig Park	2	21	16
Riverside Park	0	17	10
Silversands	0	18	19

Table 2. Total number of species found at amenity grassland (2014) and wildflower-rich grassland in 2015 and 2016.

Looking specifically at the number of species of pollinating insect present at sites created at the start of the project in 2014 (see Fife's Buzzing Pollinator Survey – Year 1), the number of species present increased from 2015 on Dunnikier Golf Course, Dunfermline Public Park and in Silversands; and number of species reduced from 2015 in Cotlands, Dunnikier Park, Poplar

Road, Ravenscraig Park and Riverside Park (Table 2). The largest increase in pollinating insect species found was at Dunfermline Public Park where there was two pollinating species present in 2014 and 14 pollinating species present in 2016 (Table 2). The biggest observed reduction was at Poplar Road in Methil where there was a reduction of 10 species (Table 2).

#### **4. Discussion**

A number of factors can impact pollinator diversity in wildflower-rich grasslands. Inconsistent seasonal variations and extreme weather can cause annual changes in pollinator numbers and survey days which occur on cool, wet or windy days can reduce the number of pollinators out foraging. Due to the unpredictability of Scottish summers it is not always possible to survey on warm, dry days. Other variables such as meadow management regimes, proximity to other suitable habitat, how sheltered a site is and the size of wildflower-rich grasslands may also impact the number of species of pollinator observed.

Summers in Scotland have a mixture of dry and wet weather which varies from year to year across the country. Generally speaking the east coast is cool and dry whereas the west coast is warm and wet. This changeable weather is being further influenced by climate change which is causing summer droughts, flooding and other local extreme weather events. The weather during 2016 in Scotland was particularly poor with the summer being highly variable and very wet. This may have negatively influenced pollinators at wildflower grassland sites in this project as poor weather reduces the foraging behaviour of pollinators (Tuell and Isaacs, 2010). It was highlighted by Butterfly Conservation during their annual [Big Butterfly Count in](#) 2016 that it was a very poor year for butterflies and some moths although it is currently unclear what the cause for this reduction might be.

Regardless of the wet and variable weather throughout the summer of 2016, the surveys in this project indicate that the positive impact of the presence of wildflower habitat on localised pollinator numbers was maintained from the previous year. This indicates that the habitat created and managed at these sites has been successful in providing foraging resources and nesting sites that have attracted a range of pollinators (Figure 4) and other invertebrates. Due to the creation regime adopted for this project, the proportion of annual flowers is greater in year one of the meadow's life. As such, there may be a higher proportion of flora in the meadows during the first year which is why we see such a rapid rise in pollinator species numbers. Following this, as the meadow evolves you might expect to see the number of pollinator species to level out. This may explain the results we find in Table 2 where the number of pollinator species did not continue to rise and in some cases dropped a little. The number of pollinator species present on Poplar Road dropped by around half which is quite substantial. The reason for this may be down to the fact that this meadow did not receive its autumn cut in 2015 as the grass-cutting machine broke down. As a result this increased competition between wildflowers and grasses and there was an observed lower floral diversity in 2016 which could have been the cause subsequently lower pollinator diversity. This also resulted in an increase in plant and grass bugs (true bugs in the Family Miridae) which were the dominant invertebrate group at the site.

Conversely, a greater number of species of invertebrate were observed at Tayport Common, Formonthills and Leuchatsbeath. This may be due to a number of factors such as proximity to other suitable habitat as these sites are all either enclosed within diverse, green spaces or are located near to woodland habitat. This may provide additional pollinator habitat or shelter and therefore increase the number of species present at the site. This supports the case for creating wildlife corridors as the provision of connective habitat allows the moving and mixing of species across an area and through their creation they can have an almost instant impact on the presence and health of wildlife. However, further investigation and analysis would have to be undertaken to establish the relationship between meadows and their proximity to other pollinator habitat. Wildflower and grassland meadows can vary naturally and this may have been the case here.



Figure 5. A pair of White-tailed bumblebees (*Bombus lucorum*) mating at the North Meadow in Formonthills, Glenrothes.

It is worth noting that there were no baseline surveys carried out for meadows created at Commscope and managed at Dalbeath Farm because they are privately managed. The land owners of both sites are managing their meadows by cutting it once a year in autumn and removing these cuttings. The meadow at Dalbeath Farm is an evolving grassland in a former quarry and as such is already showing interesting levels of invertebrate and botanical diversity.

During the surveys of amenity grassland at Tayport Common, Haugh Park and Bankie Park a total of five different species of invertebrate were observed including Buff-tailed bumblebee

(*Bombus terrestris*), a fly (Diptera species), Seven spot ladybird (*Coccinella septempunctata*), Green veined white butterfly (*Pieris napi*) and White-tailed bumblebee. These species were observed flying across the sites surveyed. No species of pollinating insect were observed flying across amenity grassland at Bankie Park in Anstruther. The complete lack of pollinators here may be due to this site being particularly isolated from good pollinator habitat and the exposed, windy nature of the park.

The great variety of butterflies and moths found across wildflower-rich grassland sites included Green-veined white (*Pieris napi*), Peacock butterfly (*Anachis io*), Small tortoiseshell (*Aglaia urticae*), Small copper butterfly (*Lycaena phlaeas*), Peacock butterfly (*Aglaia io*), Large white (*Pieris brassicae*), Ringlet butterfly (*Aphantopus hyperantus*) and Meadow brown (*Maniola jurtina*). Although Small tortoiseshell and Peacock butterflies have been more populous in previous years, there was only two sightings of the Small tortoiseshell and one sighting of the Peacock butterfly this year.

Additionally, nine species of bee were found across the parks including the Early bumblebee (*Bombus pratorum*), Davies Colletes solitary bee (*Colletes daviesanus*) and Buff-tailed bumblebee (*Bombus terrestris*). The presence of a high diversity of bee species is especially important to observe as bees fulfil a key role in pollinating our crops and flowers within the natural landscape. A good diversity of bee species safeguards against losses due to environmental pressures such as climate change. Where some species may be weaker in response to such threats, others will cope better which is why it is essential to monitor and conserve as many species as possible.

The increase and maintenance of pollinator diversity and the presence of other wildlife indicates that the wildflower-rich grasslands created by this project are, so far, successful in providing new habitat and important resources within parks across Fife. This is incredibly important given that pollinators are facing a range of threats including pesticides, habitat loss and climate change that have resulted in the decline of many species across the UK. The impact this project has had on pollinator diversity in the parks of Fife will be further analysed and assessed at the end of the project in June 2017.

## **5. Conclusion**

A total of 122 invertebrate species, including 65 species of pollinating insects, were recorded at the 21 parks surveyed in summer 2016. Only five species of invertebrate were recorded during baseline surveys of amenity grassland at three parks created in 2016. The creation of wildflower meadows through the Fife's Buzzing project has used native wildflower species of known origin by sowing seed and planting plug plants of a diverse range of species. This has enhanced wildflower meadows already present as well as created new areas and has brought significant benefits to the local wildlife, particularly pollinating insects such as bees, hoverflies and butterflies that feed on a variety of wildflower species.

## **Acknowledgements**

A big thank you to our project partners Fife Council and all their hard work and enthusiasm. Thank you also to Commscope and Dalbeath Farm for their contribution and collaboration on this project.

Order	Species	Common name	Bankie Park	Bumblebee Wood	Commscope	Cotland Park	Cupar Orchard	Dalbeath farm	Dunfermline Public Park	Dunnikier Golf Course	Dunnikier Park
Aranaea	Aranaea species	Immature spider									•
Aranaea	Araneidae species	Orb weaver spider						•			
Aranaea	<i>Larinioides cornutus</i>	Orb weaver spider						•			
Aranaea	Linyphiidae species	Money spider						•	•		
Aranaea	<i>Tetragnatha extensa</i>	Long jawed spider						•			
Aranaea	<i>Tetragnatha</i> species	Long-jawed spider		•	•			•			
Aranaea	<i>Xysticus</i> species	Crab spider			•						
Coleoptera	Apionidae species	Weevil				•		•			•
Coleoptera	<i>Coccinella septempunctata</i>	Seven-spot ladybird									•
Coleoptera	Curculionidae species	Broad nosed weevil					•	•			
Coleoptera	Leiodidae species	Fungus beetle							•		
Coleoptera	<i>Neocrepidodera transversa</i>	Flea beetle			•						
Coleoptera	Nitidulidae species	Pollen beetle		•		•				•	•
Coleoptera	<i>Oulema melanopus</i>	Cereal leaf beetle					•				
Coleoptera	<i>Rhagonycha fulva</i>	Red soldier beetle				•					
Dermaptera	<i>Forficula auricularia</i>	Earwig				•	•			•	
Diptera	<i>Bibio clavipes</i>	Bibionidae						•			
Diptera	<i>Dilophus febrilis</i>	Common fever fly	•		•						
Diptera	Diptera species	Fly							•		
Diptera	<i>Episyrphus balteatus</i>	Marmalade Hoverfly				•			•		
Diptera	<i>Eristalis</i> species	Dronefly	•	•		•	•		•		
Diptera	<i>Helophilus pendulus</i>	Tiger hoverfly		•		•	•		•		
Diptera	<i>Melanostoma mellinum</i>	Hoverfly			•						
Diptera	<i>Melanostoma scalare</i>	Hoverfly		•	•						

Diptera	<i>Melanostoma species</i>	Hoverfly						•			
Diptera	<i>Myathorpa florea</i>	Batman hoverfly	•								
Diptera	<i>Platycheirus albimanus</i>	Hoverfly	•	•		•					
Diptera	<i>Platycheirus clypeatus</i>	Hoverfly				•		•	•		
Diptera	<i>Platycheirus species</i>	Hoverfly		•							
Diptera	<i>Rhamphomyia species</i>	Dagger fly							•		
Diptera	<i>Scathophaga stercoraria</i>	Yellow dung fly				•					
Diptera	<i>Syrphidae species</i>	Hoverfly					•			•	
Diptera	<i>Tephritidae species</i>	Picture wing fly									•
Diptera	<i>Tipulidae species</i>	Crane fly	•	•	•	•	•	•		•	•
Diptera	<i>Bibionidae species</i>	Fly	•								
Gastropoda	<i>Arion ater</i>	Black slug		•			•				
Hemiptera	<i>Anthocoris nemorum</i>	Flower bug		•		•	•		•	•	•
Hemiptera	<i>Aphidoidea species</i>	Aphid		•		•		•	•	•	•
Hemiptera	<i>Aphrophoridae species</i>	Froghopper						•	•		
Hemiptera	<i>Cicadella viridis</i>	Leafhopper			•						
Hemiptera	<i>Cicadellidae species</i>	Leafhopper			•				•		
Hemiptera	<i>Closterotomus norvegicus</i>	Potato Capsid				•					
Hemiptera	<i>Hemiptera species</i>	True bug nymph									•
Hemiptera	<i>Leptopterna dolabrata</i>	Grass bug				•		•	•		
Hemiptera	<i>Lygaeidae species</i>	True bug				•			•		
Hemiptera	<i>Lygus rugulipennis</i>	Tarnished plant bug		•	•					•	•
Hemiptera	<i>Miridae species</i>	Grass bug		•			•			•	•
Hemiptera	<i>Miridae species</i>	Grass bug nymph					•		•		•
Hemiptera	<i>Nabis flavomarginatus</i>	Damsel bug									•
Hemiptera	<i>Pentatoma rufipes</i>	Red-legged Shield bug							•		
Hemiptera	<i>Pentatomoidea species</i>	Shield bug nymph									•
Hemiptera	<i>Philaenus spumarius</i>	Common froghopper		•		•	•	•			•
Hemiptera	<i>Phylus palliceps</i>	Plant bug				•					

Hemiptera	<i>Plagiognathus arbustorum</i>	Plant bug				•					
Hemiptera	<i>Stenodema calcarata</i>	Grass bug		•	•	•		•			
Hemiptera	<i>Stenodema holsata</i>	Plant bug								•	
Hemiptera	<i>Stenodema laevigata</i>	Grass bug				•				•	•
Hymenoptera	<i>Apis mellifera</i>	Honey bee	•								
Hymenoptera	Apocrita species	Solitary wasp		•		•			•		
Hymenoptera	<i>Bombus lapidarius</i>	Red-tailed bumblebee	•		•			•	•	•	
Hymenoptera	<i>Bombus lucorum</i>	White-tailed bumblebee						•	•		
Hymenoptera	<i>Bombus pascuorum</i>	Common carder bee	•		•	•		•	•	•	•
Hymenoptera	<i>Bombus pratorum</i>	Early bumblebee				•		•			
Hymenoptera	<i>Bombus terrestris</i>	Buff-tailed bumblebee	•		•				•		
Hymenoptera	Formicidae species	Ant					•				
Hymenoptera	Ichneumonidae species	Parasitoid Wasp			•	•	•			•	•
Hymenoptera	Tenthredo species	Sawfly				•				•	
Hymenoptera	<i>Vespula germanica</i>	German wasp				•				•	
Hymenoptera	<i>Vespula vulgaris</i>	Common wasp				•	•			•	
Lepidoptera	<i>Aglais urticae</i>	Small tortoiseshell	•								
Lepidoptera	<i>Aphantopus hyperantus</i>	Ringlet butterfly						•			
Lepidoptera	<i>Autographa gamma</i>	Silver-Y moth							•		
Lepidoptera	Lepidoptera species	Caterpillar							•		•
Lepidoptera	Lepidoptera species	Looper caterpillar							•		
Lepidoptera	Lepidoptera species	Micromoth		•		•	•			•	•
Lepidoptera	Lepidoptera species	Moth									•
Lepidoptera	<i>Maniola jurtina</i>	Meadow brown						•			
Lepidoptera	<i>Pieris napi</i>	Green-veined white				•	•		•	•	•
Lepidoptera	<i>Pieris rapae</i>	Small white								•	•
Lepidoptera	<i>Vanessa atlanta</i>	Red admiral									•
Neuroptera	Neuroptera species	Lacewing larvae				•					

Odonata	<i>Sympetrum striolatum</i>	Common darter									•	
Opiliones	Opiliones species	Harvestman					•	•				
Orthoptera	<i>Omocestus viridulus</i>	Common green grasshopper							•			

Order	Species	Common name	Formothills	Guardbridge Park	Haugh Park	Leuchatsbeath	Poplar Road	Ravensraig Park	Riverside Park	Shinty pitch	Silversands	St. Andrews Botanic Gardens	Tayport Common	Woodend Park
Acari	Acari species	Mite	•											
Aranaea	Aranaea species	Immature spider	•	•						•		•	•	
Aranaea	Aranaea species	Spider	•										•	
Aranaea	Araneidae species	Orb weaver spider	•						•				•	
Aranaea	<i>Araneus diadematus</i>	Garden cross spider									•			
Aranaea	Linyphiidae species	Money spider	•										•	
Aranaea	Lycosidae species	Wolf spider	•	•										
Aranaea	Tetragnatha species	Long-jawed spider	•									•		
Coleoptera	Aponidae species	Weevil	•						•		•		•	
Coleoptera	<i>Coccinella septempunctata</i>	Seven-spot ladybird					•	•			•		•	
Coleoptera	Curculionidae species	Broad nosed weevil											•	
Coleoptera	<i>Neocrepidodera transversa</i>	Flea beetle											•	
Coleoptera	<i>Nicrophorus vespilloides</i>	Sexton beetle				•								
Coleoptera	Nitidulidae species	Pollen beetle	•		•		•		•		•		•	•
Coleoptera	<i>Oulema melanopus</i>	Cereal leaf beetle											•	
Coleoptera	<i>Rhagonycha fulva</i>	Red soldier beetle				•							•	
Coleoptera	Staphylinidae species	Rove beetle		•										
Coleoptera	<i>Stenus similis</i>	Rove beetle		•	•							•		

Dermaptera	<i>Forficula auricularia</i>	Earwig		•				•			•		•	
Diptera	<i>Bibio clavipes</i>	Fly	•										•	
Diptera	<i>Cheilosia bergenstammi</i>	Hoverfly												•
Diptera	<i>Chrysogaster cemiteriorum</i>	Hoverfly			•									
Diptera	<i>Dilophus febrilis</i>	Common fever fly				•								•
Diptera	Diptera species	Fly		•		•							•	
Diptera	<i>Episyrphus balteatus</i>	Marmalade Hoverfly				•				•	•	•	•	
Diptera	<i>Eristalis arbustorum</i>	Drone fly											•	
Diptera	<i>Eristalis species</i>	Dronefly	•		•	•		•			•		•	
Diptera	<i>Eristalis pertinax</i>	Dronefly			•									
Diptera	<i>Helophilus pendulus</i>	Tiger hoverfly		•	•	•								
Diptera	<i>Melanostoma mellinum</i>	Hoverfly	•				•		•				•	
Diptera	<i>Melanostoma scalare</i>	Hoverfly			•		•	•	•	•	•			
Diptera	<i>Myathorpa florea</i>	Batman hoverfly			•								•	
Diptera	<i>Platycheirus albimanus</i>	Hoverfly	•			•			•					
Diptera	<i>Platycheirus clypeatus</i>	Hoverfly				•	•							
Diptera	<i>Platycheirus manicatus</i>	Hoverfly	•											
Diptera	Platycheirus species	Hoverfly	•											•
Diptera	<i>Syrirta pipiens</i>	Thick legged hoverfly											•	
Diptera	Syrphidae species	Hoverfly	•									•	•	
Diptera	<i>Syrphus ribesii</i>	Common banded hoverfly									•		•	
Diptera	<i>Syrphus torvus</i>	Hairy eyed hoverfly											•	
Diptera	<i>Syrphus vitripennis</i>	Hoverfly								•				
Diptera	Tabanidae species	Horsefly			•	•								
Diptera	Tephritidae species	Picture wing fly	•		•			•			•		•	
Diptera	<i>Tephritis vespertina</i>	Picture wing fly	•							•	•			
Diptera	Tipulidae species	Cranefly	•	•	•	•	•	•	•	•	•		•	•
Gastropoda	<i>Arion ater</i>	Black slug						•						
Hemiptera	<i>Anoscopus albifrons</i>	Leafhopper				•								

Hemiptera	<i>Anthocoris nemorum</i>	Flower bug	•	•					•		•	•		•
Hemiptera	Aphidoidea species	Aphid	•		•	•			•		•	•	•	
Hemiptera	<i>Aphrodes makarovi</i>	Leaf hopper	•											
Hemiptera	Aphrophoridae species	Froghopper	•						•					
Hemiptera	<i>Apolygus lucorum</i>	Plant bug									•			
Hemiptera	<i>Cantharis pellucida</i>	Green aphid											•	
Hemiptera	<i>Cicadella viridis</i>	Leafhopper	•											
Hemiptera	<i>Closterotomus norvegicus</i>	Potato Capsid	•	•			•			•				
Hemiptera	<i>Conosanus obsoletus</i>	Froghopper							•					
Hemiptera	<i>Dicyphus globulifer</i>	Plant bug			•						•			
Hemiptera	Hemiptera species	True bug nymph					•				•			
Hemiptera	Hemiptera species	True bug									•			
Hemiptera	<i>Leptopterna dolabrata</i>	Grass bug	•			•	•							
Hemiptera	<i>Leptopterna ferrugata</i>	Plant bug	•			•								
Hemiptera	<i>Lygus lineolaris</i>	Tarnished plant bug	•						•					
Hemiptera	<i>Lygus rugulipennis</i>	Tarnished plant bug	•	•					•		•			•
Hemiptera	Miridae species	Grass bug				•								
Hemiptera	Miridae species	Grass bug nymph	•			•	•		•	•	•			•
Hemiptera	<i>Nabis ferus</i>	Field damsel bug					•							
Hemiptera	<i>Neophilaenus lineatus</i>	Froghopper						•						
Hemiptera	<i>Pentatoma rufipes</i>	Red-legged Shield bug			•									
Hemiptera	Pentatomoidea species	Shield bug nymph	•					•		•	•			
Hemiptera	<i>Philaenus spumarius</i>	Common froghopper	•			•	•	•			•			•
Hemiptera	<i>Pithanus maerkeli</i>	Plant bug	•											
Hemiptera	<i>Plagiognathus arbustorum</i>	Plant bug	•											
Hemiptera	<i>Plagiognathus chrysanthemi</i>	Plant bug	•											
Hemiptera	<i>Stenodema calcarata</i>	Grass bug		•		•	•		•					
Hemiptera	<i>Stenodema laevigata</i>	Grass bug												•
Hemiptera	<i>Stenotus binotatus</i>	Plant bug				•								

Hymenoptera	<i>Apis mellifera</i>	Honey bee			•	•		•					•	
Hymenoptera	<i>Apocrita species</i>	Solitary wasp						•	•		•			
Hymenoptera	<i>Apoidea species</i>	Solitary bee						•						
Hymenoptera	<i>Bombus horotorum</i>	Garden bumblebee			•						•		•	
Hymenoptera	<i>Bombus lapidarius</i>	Red-tailed bumblebee				•	•	•		•	•		•	
Hymenoptera	<i>Bombus lucorum</i>	White-tailed bumblebee			•	•	•	•			•		•	
Hymenoptera	<i>Bombus pascuorum</i>	Common carder bee	•		•	•	•	•		•	•	•	6	
Hymenoptera	<i>Bombus pratorum</i>	Early bumblebee						•			•			
Hymenoptera	<i>Bombus terrestris</i>	Buff-tailed bumblebee	•	•	•		•	•		•	•		•	
Hymenoptera	<i>Colletes daviesanus</i>	Davie's colletes bee								•			•	
Hymenoptera	Formicidae species	Ant			•									
Hymenoptera	Formicidae species	Flying ant		•										
Hymenoptera	<i>Halictus rubicundus</i>	Orange legged furrow bee											•	
Hymenoptera	Ichneumonidae species	Parasitoid Wasp	•		•				•	•		•	•	•
Hymenoptera	<i>Lasius niger</i>	Black garden ant			•									
Hymenoptera	Sawfly species	Sawfly larvae											•	
Hymenoptera	Tenthredo species	Sawfly	•						•					•
Hymenoptera	<i>Vespula germanica</i>	German wasp							•					
Hymenoptera	<i>Vespula vulgaris</i>	Common wasp			•			•		•	•	•		
Lepidoptera	<i>Aglaia io</i>	Peacock butterfly											•	
Lepidoptera	<i>Aglaia urticae</i>	Small tortoiseshell				•							•	
Lepidoptera	Lepidoptera species	Caterpillar			•	•							•	
Lepidoptera	Lepidoptera species	Looper caterpillar				•		•			•	•		
Lepidoptera	Lepidoptera species	Micromoth					•		•				•	
Lepidoptera	Lepidoptera species	Moth						•			•			•
Lepidoptera	<i>Lycaena phlaeas</i>	Small copper				•					•		•	
Lepidoptera	<i>Noctua pronuba</i>	Large yellow underwing				•								
Lepidoptera	<i>Pieris brassicae</i>	Large white											•	

Lepidoptera	<i>Pieris napi</i>	Green-veined white		•	•								•	
Lepidoptera	<i>Pieris rapae</i>	Small white									•		•	
Lepidoptera	<i>Sideridis rivularis</i>	Campion moth caterpillar						•						
Lepidoptera	<i>Tyria jacobaeae</i>	Cinnibar moth caterpillar				•								
Lepidoptera	<i>Vanessa atlanta</i>	Red admiral											•	
Lepidoptera	<i>Yponomeuta evonymella</i>	Bird cherry ermine moth	•											
Neuroptera	Neuroptera species	Lacewing										•		
Neuroptera	Neuroptera species	Lacewing larvae				•							•	
Opiliones	Opiliones species	Harvestman										•		
Trichoptera	Trichoptera species	Caddisfly	•						•					

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Contact us: Buglife, Balallan House, 24 Allan Park, Stirling, FK8 2QG

[www.buglife.org.uk](http://www.buglife.org.uk)

Tel: 01786 447504

Email: [info@buglife.org.uk](mailto:info@buglife.org.uk)

[@buzz\\_dont\\_tweet](https://twitter.com/buzz_dont_tweet)

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